

**AMERICAN TECHNOLOGY INITIATIVE, INC.**  
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March 7, 1995

TO: Maylene Duenas  
Technical Monitor, NCC2-648  
NASA Ames Research Center

FR: David Lloyd  
Principal Investigator

RE: Research Product - AmTech History

Following is the White Paper you requested concerning the formation and development of American Technology Initiative. This is submitted to you in partial fulfillment of NASA Ames Cooperative Agreement NCC2-648, which requires AmTech to submit periodic reports to NASA summarizing research undertaken by AmTech.

As you know, one of the most important research findings to date of the JSR Program has been the importance of using a nonprofit facilitator to assist with the implementation of JSR projects between NASA and the private sector. This White Paper documents the development of AmTech as one such facilitator.

I suggest that you ask Syed Shariq and George Lenehan to review this document since they have had a substantial impact on the development and direction of the JSR Program and AmTech.

Thank you for your continuing support and assistance.

Attach.

**THE FORMATION AND DEVELOPMENT OF  
AMERICAN TECHNOLOGY INITIATIVE, INC.  
-- AN HISTORICAL PERSPECTIVE<sup>1</sup>**

**Introduction**

The formation and development of American Technology Initiative, Inc. (AmTech) closely parallels the development of NASA's Joint Sponsored Research (JSR) Program. While the latter had its genesis in research undertaken years before AmTech existed, the Program and the organization began about the same time and remained inextricably intertwined through the early years. The JSR Program was converted into an experimental NASA program shortly after AmTech began operations, and its success has been due in large measure to the success and perseverance of AmTech, while the JSR Program has provided AmTech with the foundation upon which to build its expertise.

AmTech was formed in July 1989, and began operating October 1 that year. It is a nonprofit corporation conceived to research, develop and test technology transfer processes and techniques between government laboratories and the private sector in order to promote U.S. competitiveness. AmTech's first research activity for NASA was to examine the use of Space Act authority as a means of forming public/private R&D partnerships. This research effort quickly evolved into a framework for the JSR Program. AmTech focused all its resources on this NASA program during its initial years of operations, and the AmTech staff, managed by a NASA employee, was also the staff for the JSR Program until mid-1991. As a result, the formation and development of AmTech parallels the development of NASA's JSR Program.

The seeds of the JSR Program were sown in the early 1980's at the NASA Ames Research Center. From those seeds AmTech began in 1989, incorporated as a California nonprofit organization.<sup>2</sup> Since its beginnings, the JSR Program has grown, with continuous fostering and persistence by

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<sup>1</sup> Submitted to NASA March 7, 1995, in partial fulfillment of NASA Ames Cooperative Agreement NCC2-648. Written by David Lloyd, with substantial assistance from Eric Brachhausen, Stephen Gomes, Paul Masson, Karen Robbins, and Bernard Zuzo, all of the AmTech staff.

<sup>2</sup> AmTech was incorporated on July 6, 1989 as an organization subject to §501(c)(3) of the Internal Revenue Code.

AmTech, and although it is not yet a formal NASA program, it continues to have an agency-wide impact, it is being used by multiple NASA Centers, and AmTech is using the lessons learned from its experience implementing the JSR Program to assist other federal agencies with the commercialization of a variety of publicly-funded technologies.

#### **Research and Concept Development (1984-1987)**

The basic tenet of the JSR Program is the use by NASA of its Space Act authority<sup>3</sup> to obligate funds and in-kind resources to one or more private sector participants who will match NASA's obligation in order to further the R&D objectives of NASA and the other participants. Although NASA has had this authority since 1958, with few exceptions it had been unwilling to utilize it prior to the inception of the JSR Program. One such exception, notable for the development of the Program, occurred at NASA Ames, where the NASA Ames University Consortium was established in 1969 with Santa Clara University.<sup>4</sup>

This consortium, spearheaded by J. Henry Glazer, the NASA Ames Chief Counsel at the time, was unique to the Center and was the first use of the Space Act to obligate funds to universities for research purposes. At its peak, the Consortium had over 360 university participants, and the Consortium Office at NASA Ames had processed several hundred Interchanges, obligating up to \$40,000 each for research purposes. This streamlined and well-defined process was widely used at the Center and operated outside the purview of the procurement and grants office.<sup>5</sup>

In 1978, the Chief Counsel utilized the Consortium mechanism to negotiate an Interchange Agreement with the University of California, Hastings College of the Law in San Francisco, establishing the NASA/Hastings Research Project to provide legal research and assistance to his

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<sup>3</sup> This authority is found in §§203(c)(5)&(6) of the National Aeronautics and Space Act of 1958 (42 U.S.C. §2473(c)).

<sup>4</sup> Agreement Between the NASA Ames Research Center and Participating Universities for Reciprocal Use of Services, Equipment, Personnel and Facilities and for Other Purposes, executed by NASA Ames and the University of Santa Clara on September 11, 1969.

<sup>5</sup> It sometimes was referred to by those who used it as a convenient method for obtaining the necessary "arms and legs" to fill the Center's research facilities. While the NASA Ames University Consortium still exists, the use of Consortium Interchanges has been curtailed, and the Consortium Office is now part of the University Grants Office.

office.<sup>6</sup> That Project existed for ten years, and the original Interchange was amended 23 times, with total project funding exceeding \$1.4 million. The original research charter of the NASA/Hastings Research Project called for an examination of the legal aspects of living and working in space for long duration.<sup>7</sup> As the Project evolved, the legal research took on a more practical bent, examining provisions of the Space Act for ways that NASA could work more efficiently with the private sector. Research results confirmed the theory expounded by Glazer that NASA could "partner" with the private sector using the authority of the Space Act to avoid, rather than evade, the procurement laws.

In 1984, Glazer and others in the Project Office began a serious effort to transform their research into a generic "partnership agreement" by which NASA could collaborate with the private sector on various R&D projects of interest to the participants. This generic agreement was based loosely on the earlier Consortium Agreement. However, in addition to a consortium of universities working with NASA, the new version included multiple industry participants available to partner with NASA and the universities on a variety of R&D ventures of interest to all participants. The development of this agreement occurred in conjunction with a NASA-wide push for more technology transfer and development of the commercial use of space activities that began in the mid 1980's.

As this agreement took shape it became known as the "Articles of Joint Enterprise," designed to supersede and incorporate the Consortium Office. The structure for implementation of multi-party R&D ventures became more elaborate with each succeeding draft of the Articles. When finalized, it was proposed that the Joint Enterprise endeavor would be operated not by the Consortium Office, but by a General Secretariat Office, to be managed by a Joint Enterprise Council and administered by a General Secretary, with the university and industry participants each to be represented by separate Committees of Correspondence. On October 6, 1986, this structure and its underlying principles were formally accepted by NASA Ames when the Director, William Ballhaus, signed the Articles of Joint Enterprise with the

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<sup>6</sup> Both David Lloyd and Karen Robbins, currently on the AmTech staff, began their associations with NASA at the NASA/Hastings Research Project.

<sup>7</sup> This field of study came to be known as "Astrolaw," a term coined by Glazer, but never accepted by the legal community.

San Francisco State University Foundation, the agent organization for administering the Articles and establishing the General Secretariat Office.

The initial Joint Enterprise Council was composed of Richard Reeves, Associate Director of NASA Ames, and Arthur Cunningham, Chairman of the Board of the SFSU Foundation (and Dean of the SFSU Business School). The Joint Enterprise Office operations were funded by NASA Ames through a Consortium Interchange, and the interim Project Director of that office was Elizabeth Inadomi, of the NASA Ames External Affairs Office. A search began to find a permanent General Secretary of the Joint Enterprise, culminating with the appointment of Syed Shariq to that position in 1987. He was a branch chief in the information sciences division at NASA Ames, and was detailed to the SFSU Foundation through an Intergovernmental Personnel Act agreement to work full time at the Joint Enterprise office.

The initial business office for the Joint Enterprise was established at the Techmart Center in Santa Clara, and the legal office was established at the NASA/Hastings Project Office. In April 1988, both offices were consolidated into the Joint Enterprise Office in Menlo Park. By that time, Victor Peterson, NASA Ames Deputy Director, had replaced Richard Reeves on the governing council.

#### **Developing the Theory (1987-1989)**

Shortly after Shariq became General Secretary, the Joint Enterprise initiated discussions with Carla Wong, a scientist from the NASA Ames information sciences division, Mike Storey of the Finnigan Corporation in San Jose, and Rick Yost, a scientist from the University of Florida, on a potential R&D collaboration to enhance and miniaturize an ion mass spectrometer. These discussions culminated 8 months later in the signing, by those participants and the SFSU Foundation, of the first Joint Enterprise Project.<sup>8</sup> This represented the first use by NASA Ames of the funded Space Act mechanism outside the Consortium Interchange arena. NASA obligated \$155,000 the first year of the project, and over \$350,000 during the three year

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<sup>8</sup> Mass Spectrometer-Based Intelligent Systems Manager (known as Joint Enterprise Project #8801). The project's goal was to extend the capabilities of and miniaturize an ion mass spectrometer, to explore the feasibility of its use on the Space Station, and for use in new product development by Finnigan.



life of the project. All funds flowed to, and were administered by the SFSU Foundation, on behalf of the Joint Enterprise Office, and were in turn disbursed to the University of Florida where most of the R&D work was done. Finnigan contributed cash and in-kind resources directly to the University of Florida. According to the participants, this collaboration worked well, generating four patents and several copyrights for the University and being commercially utilized by Finnigan within 14 months of the project's inception. For NASA and the Joint Enterprise, it proved the concept of collaboration between the private sector and NASA using a mechanism other than traditional procurement or grant instruments. It also demonstrated the value of using a neutral, nonprofit facilitator to implement multiparty partnerships.

As the NASA Ames management became increasingly familiar and comfortable with the Joint Enterprise concept, it became clear that the SFSU Foundation, which was primarily a grant administration organization, was not a suitable entity to run the business operations of the Joint Enterprise in the long term. The value of a neutral nonprofit facilitator was apparent however. Therefore, in early 1989, NASA Ames notified the SFSU Foundation of its intention to terminate the Articles of Joint Enterprise on September 30, 1989. The search then began to find an organization to replace the Foundation and assume the role of a viable neutral facilitator for Joint Enterprise projects. Shariq pursued the option of securing another nonprofit organization to provide a home for the Joint Enterprise, approaching local universities, government agencies and existing nonprofit organizations. Ultimately, NASA Ames management decided that a new nonprofit organization would be formed to replace the SFSU Foundation and assume the role of a viable facilitator for Joint Enterprise Projects. The Joint Enterprise staff was tasked with the responsibility of identifying legal counsel and preparing forms to organize such a nonprofit, and the NASA Ames management provided suggestions of candidates for a Board of Directors for the new organization.

#### **Forming the Facilitator (1989)**

American Technology Initiative was incorporated in California on July 6, 1989 by John Francis, an attorney and counsel to many nonprofit organizations, who had been retained by the Joint Enterprise staff to prepare

the documents necessary to form the organization.<sup>9</sup> Certification was obtained from the Office of Personnel Management for AmTech to host federal employees through arrangements under the Intergovernmental Personnel Act, and AmTech obtained tax exempt status as a 501(c)(3) organization from the Internal Revenue Service in early 1990.

AmTech's first Board of Directors meeting was held on January 5, 1990 in Menlo Park. Board members were recruited in part to fill the need of the young organization to advocate its programs (and its continued existence) at the highest levels of NASA and other agencies. The following individuals were elected to the Board at that meeting: Peter Banks, then Professor of Engineering at Stanford University (currently Dean of Engineering at the University of Michigan); Paul Dembling, author of the Space Act legislation and NASA's first General Counsel; John Egan, President of a consulting group specializing in commercial space activities; Richard Johnson, visiting scientist with the Universities Space Research Association and former acting Science Advisor to President Ronald Reagan; and Ray Kline, President of the National Academy of Public Administration (now retired).<sup>10</sup> Roger Heyns, President of the Hewlett Foundation (and former Chancellor of UC Berkeley), and George Kozmetsky, Director of the IC<sup>2</sup> Institute at the University of Texas, were elected affiliated (non-voting) Directors. Also at that meeting, Richard Johnson was elected Chairman of the Board, Syed Shariq was elected Chief Executive Officer, and David Lloyd was elected Secretary/Treasurer of the organization.<sup>11</sup>

AmTech was funded beginning October 1, 1989, by NASA Ames cooperative agreement NCC2-648, to conduct research into the use of the Space Act and other mechanisms for R&D collaboration with the private

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<sup>9</sup> AmTech's Articles of Incorporation state that AmTech will "[u]ndertake fundamental, theoretical, or experimental research leading to the expansion of knowledge in the areas of aerospace research, technology transfer, commercialization and related areas; undertake research directed toward the practical uses of knowledge gained from [this] research; and enhance in the private sector entrepreneurial and investment opportunities through the transfer of knowledge and technologies." Mr. Francis currently serves as AmTech's corporate counsel.

<sup>10</sup> Peter Banks resigned in 1991 and was replaced by Paul Coleman, President of the Universities Space Research Association. In 1992, the Board was increased to seven voting Directors and Stanley Weiss, Professor Aeronautics at MIT, was elected to one of the newly created positions. Currently, there is one vacancy on the Board.

<sup>11</sup> Johnson and Lloyd continue in their respective capacities.

sector.<sup>12</sup> All of the assets and resources of the Joint Enterprise Office were transferred to AmTech from the SFSU Foundation as part of NASA's termination settlement with that organization. All of the existing Joint Enterprise staff chose to be employed by AmTech, and AmTech assumed all duties and responsibilities of the SFSU Foundation in the on-going Joint Enterprise Project for development of the ion mass spectrometer.

### **Proving the Concept (1989 - 1993)**

The original theories underlying the Articles of Joint Enterprise remained, but were now supported by three years of practical experience implementing the concept. Concurrently with the start up of operations, the AmTech staff began to originate and negotiate additional Joint Enterprise projects with NASA Ames and private sector entities. As the first of these progressed towards the final stages of negotiation, the new NASA Ames Chief Counsel, George Lenehan, informed the AmTech staff that authority to sign Space Act agreements obligating NASA funds rested solely with the NASA Administrator, and that that authority had never been delegated to any other official. Consequently, the first Joint Enterprise project, as well as all NASA Ames Consortium Interchanges, had been entered into by NASA Ames without proper authorization. Lenehan subsequently decided that, because the mass spectrometry project was nearly complete, as were the majority of Consortium Interchanges, the NASA Ames' Director's lack of authority to commit the Center was of little practical consequence.<sup>13</sup>

The AmTech staff viewed the funded Space Act authority as the most important feature of Joint Enterprise projects and an important incentive for the private sector to collaborate with the government. Likewise, the ability to enter into these arrangements without seeking review and approval from NASA Headquarters was an important and valuable consideration. In order to continue with these collaborations using the funded Space Act mechanism, it was necessary to further develop the principles and procedures underlying these arrangements and seek formal approval from NASA Headquarters to continue with their development. Consequently, in early 1990, Shariq and Lenehan began a series of briefings to senior managers and the legal office at

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<sup>12</sup> NCC2-648 continues to be AmTech's primary source of funding.

<sup>13</sup> This position was later ratified by the NASA General Counsel. The Consortium Interchanges continue to be used by NASA Ames (see note 5 and accompanying text).



NASA Headquarters on the legal and practical aspects of the Joint Sponsored Research Program.<sup>14</sup> They gave similar briefings to the management and attorneys at most of the NASA Centers as well.

This "road show" raised the visibility within NASA of the JSR Program and AmTech which, in some ways, was beneficial to both. The benefits of the JSR Program became apparent to a wider audience, and AmTech was viewed by most of the users of the Program as providing a valuable service to NASA. On the other hand, this higher profile raised the ire of some at NASA when they understood that AmTech intended to become financially self-supporting based on revenue derived from oversight of JSR Projects.<sup>15</sup>

The increased visibility and apparent benefits of the JSR Program facilitated the implementation of the second JSR Project, which was a hybrid of the original idea. Because Space Act authority was not available to the participants in the time frame required to begin the research, AmTech and NASA Ames used a cooperative agreement to fund research at the Virginia Polytechnic Institute and executed a Memorandum of Understanding (MOU) with the Navy, the State of Virginia, several aeronautics companies and universities to form the ACSYNT Institute,<sup>16</sup> which began January 1, 1990. While the structure of the Institute worked well enough initially, the cumbersome use of a cooperative agreement and MOU to fund and operate the Institute relied heavily on the good will of all participants and the assumption of the risk by VPI that the government and aeronautics companies would participate as equal partners for the five year duration of the research. It also provided AmTech with a good argument to advocate use of the funded Space Act mechanism to establish the rights and responsibilities of all participants within the framework of a single agreement.

AmTech's advocacy of the JSR Program was not without risks. In the summer of 1991, the Associate Administrator for Aeronautics and Space Technology, Arnold Aldrich, suspicious of the symbiotic relationship of the

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<sup>14</sup> This term was suggested by George Lenehan, as a way of distinguishing this Program from the Joint Enterprise, which had developed negative connotations within NASA.

<sup>15</sup> Over time, the AmTech management realized that the goal of financial self-sufficiency based on JSR project-derived revenue was not attainable given the complexity and practicalities of the JSR Program and NASA's reluctance to support this principle.

<sup>16</sup> Aircraft Synthesis Software for the Conceptual Design of Aircraft (ACSYNT). The NASA Ames' Principal Investigator for this project is Paul Gelhausen.

JSR Program and AmTech, directed NASA Ames to restructure its relationship with AmTech by creating a separate NASA JSR Program and appointing an Ames Technical Monitor to oversee the Program. In addition, Aldrich instructed NASA Ames to investigate alternative legal relationships between NASA and AmTech, intended to provide more NASA control over the JSR Program. The NASA Ames Director, Dale Compton, initially responded by ordering that the JSR Program and the funding relationship with AmTech be terminated, deeming the Aldrich instructions too restrictive to implement. Shariq used research supplied by the AmTech staff to convince the NASA Ames management and Aldrich of the value of continuing the existing cooperative relationship between NASA and AmTech. The Program was restructured to establish a Technical Monitor at NASA Ames, and AmTech proposed entering into a Memorandum of Understanding with NASA Headquarters for implementation of the JSR Program. To facilitate that implementation, NASA formed a JSR Program Advisory Group, composed of representatives from Headquarters and Ames.<sup>17</sup> This group met approximately every two months through mid-1992, to approve AmTech-designed policies and procedures for an agency-wide program, to advocate strategies for delegating funded Space Act authority from the Administrator, and to resolve issues arising from JSR projects in various stages of development. On March 31, 1992, Administrator Richard Truly delegated his authority to enter into JSR Agreements (funded Space Act agreement) to the Associate Administrator for Aeronautics and Space Technology and to the Assistant Administrator for Commercial Programs, and on June 15, 1992, AmTech and NASA signed the MOU establishing the principles for implementation of the JSR Program.<sup>18</sup>

During this time period, AmTech originated and facilitated additional JSR projects as "case studies" for the Program. AmTech established quantitative annual targets of negotiated projects in discussions with NASA JSR Program managers. Of the first six JSR projects negotiated between

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<sup>17</sup> The original appointees were Jack Mannix, from the Administrator's staff, Stan Sadin, from the Office of Aeronautics and Space Technology, and Victor Peterson, Ames' Deputy Director. When Mannix became Assistant Administrator for Commercial Programs, he appointed Frank Peñaranda as his representative. Peterson appointed George Lenehan as his representative from Ames.

<sup>18</sup> Both the delegation of authority and the NASA/AmTech MOU were for terms of two years. Both have been extended through 1995.

NASA and industry, two were implemented at NASA Ames.<sup>19</sup> The others were not implemented because final signature authority had not been delegated by the NASA Administrator. However, the unsigned transactions, together with an average of ten potential projects facilitated by AmTech each year, provided valuable research results which were compiled and presented to NASA. Because of the large volume of facilitated but unsigned transactions, AmTech's focus shifted from that of a facilitator of JSR Projects<sup>20</sup> to an advocate of those policy changes within NASA necessary for the Administrator to delegate signature authority, thereby enabling NASA to capitalize on the financial and commercial value of those projects. This was consistent with past requests by NASA management for AmTech assistance on activities not related to the JSR Program or projects.<sup>21</sup>

AmTech also developed a relationship with the Technology Transfer Office at DARPA,<sup>22</sup> and received funding to undertake research on the implementation of a technology transfer plan for DARPA's High Performance Computing and Communications Program initiative. This research culminated in 1993 with AmTech's final report of results and findings to the DARPA Program Manager, Tice De Young.

### **Concept Implementation, Acceptance and Expansion (1993-1995)**

After the national elections in 1992, new government policies emphasized the development and commercialization of federally-funded technologies as a mechanism for increasing the economic competitiveness of U.S. industry. Partnerships between the government and the private sector

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<sup>19</sup> The Video Luminescent Barometry project between NASA Ames (Blair MacLachlan, Principal Investigator), Boeing, and the University of Washington, to develop a system to measure aerodynamic parameters (pressure and temperature measurements) on aircraft (scheduled for completion in 1996); and the High Capacity Fluids project (known as "Astroade") between NASA Ames (John Greenleaf, Principal Investigator), Shaklee Corporation and San Francisco State University, to develop a rehydration drink for astronauts re-entering the earth's atmosphere (completed in 1994).

<sup>20</sup> The JSR Program manager at the time, Kevin Barquinero (Office of Commercial Technology, NASA Headquarters), viewed AmTech primarily as a facilitator of projects.

<sup>21</sup> For example, during the summer of 1992, Shariq took a leave of absence from AmTech, at the request of Victor Peterson, to serve on the committee examining NASA's technology commercialization policies (known as the Creedon Committee). He also assisted the University of Texas at Austin with the research underlying its successful proposal to NASA for the development of technology incubators at the NASA Ames and the NASA Johnson Space Centers.

<sup>22</sup> Defense Advanced Research Projects Agency (now ARPA).

were encouraged and supported. This support was reflected by increasing the budgets of several agencies, and by implementing new programs such as the multi-agency Technology Reinvestment Program (TRP) and the Advanced Technology Program (ATP) within NASA. In 1994, for the first time, the NASA Administrator issued a statement proclaiming technology commercialization as a NASA mission, as important to the agency as any other mission.<sup>23</sup>

The JSR Program fit well into this new government R&D partnership paradigm. As the Program expanded to other Centers, its scope widened, improving its usefulness to NASA R&D managers and to the private sector. The JSR Program Manager at the time, Kevin Barquinero from the Office of Commercial Programs, used the Administrator's delegation of Space Act authority as a basis to conclude that universities or nonprofit research institutions were no longer required participants in JSR Projects, and further that NASA could directly fund any private sector participant in R&D partnerships using the Space Act mechanism instead of a contract or grant.

This change in Program scope increased AmTech's ability to generate potential JSR projects. In late 1994, AmTech succeeded in implementing the Environmental Research Aircraft and Sensor Technology (ERAST) Alliance, after a 12-month formation effort. This Alliance, managed at the NASA Dryden Flight Research Center, with NASA funding of \$42 million over five years, will develop systems on unpiloted high altitude, long duration aircraft to be used for environmental research and monitoring. Private sector participants include five small aircraft companies and the Association of Unpiloted Vehicle Systems. AmTech also is a participant in the Alliance, engaged in fiduciary management, technology commercialization research, and dispute resolution as necessary.

In parallel with the development of the ERAST Project, AmTech facilitated and implemented in October 1994, the Advanced General Aviation Technology Enterprise (AGATE) Alliance, a consortium of NASA and more than 80 aircraft and avionics companies and research institutions. This is the largest consortium ever funded by NASA. It is an eight year endeavor designed to modernize the cockpit and flight technologies for the general

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<sup>23</sup> See *NASA Commercial Technology: Agenda for Change*, National Aeronautics and Space Administration, July 1994.

aviation industry in the U.S. As in the ERAST Alliance, AmTech is tasked with monitoring in-kind contributions, commercialization research and mediation if necessary. Fiduciary management for the Alliance will be handled by the AGATE Project Office at the NASA Langley Research Center, with the exception of annual membership dues from the private sector participants, which AmTech will collect.

In early 1993, the NASA/AmTech IPA Agreement for Shariq's services ended, and he returned to full time duty at NASA Ames as Staff Assistant to the Deputy Director.<sup>24</sup> He was replaced by AmTech's first CEO hired from the private sector, Stephen L. Gomes, who began his tenure May 1, 1993.

Concurrent with that appointment, AmTech began to diversify its sources of support from other federal agencies, and began outreach to the private sector. AmTech received funding in early 1994 from the Ballistic Missile Defense Organization (BMDO) to participate in various technology applications review panels across the country, evaluating the commercialization potential of various advanced technologies and making recommendations to BMDO concerning improvements in the review and commercialization processes it utilizes.<sup>25</sup> With this increased visibility and experience, AmTech began to refine the tools and expertise necessary to broaden its outreach.

In late 1994, as part of its effort to attain long term corporate viability and self-sufficiency, and based on its experience with the JSR Program, the AmTech staff developed the following corporate vision and mission statements that will guide the organization into the future.

#### The AmTech Vision

AmTech is dedicated to improving the quality of life and the environment by moving technology from innovation to application.

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<sup>24</sup> He subsequently became Director of the Commercial Technology Office, which was created after a reorganization of the Center, and which now controls the funding for and oversees AmTech's implementation of the JSR Program.

<sup>25</sup> BMDO also asked AmTech to help facilitate the commercialization of two technologies with high potential for commercialization. To this end, AmTech currently is assisting the Sandia National Laboratory with the commercialization of its RHEPP (Repetitive High Energy Pulse Power) technology, and has located several BMDO-sponsored technologies at the Jet Propulsion Laboratory with commercialization potential.



### The AmTech Mission

AmTech is the leading interdisciplinary nonprofit organization focused on public and private R&D partnership formation, research and education. AmTech's purpose is to enhance American economic competitiveness by advancing the commercialization of technology for the public benefit.

### **Future Strategies (1995 and beyond)**

As AmTech grows and matures, it continues to supplement and refine its experience in order to diversify its support and make its expertise available to other agencies and to the private sector. At the same time, AmTech is committed to facilitating and implementing additional JSR projects with NASA, using its research to suggest changes and improvements to the Program and to advocate agency-wide use, acceptance and formal implementation of the JSR Program. AmTech has worked to make the Program a valuable tool that can be used by all NASA Centers to work effectively with the private sector. Although AmTech's support for and commitment to the JSR Program remain strong, AmTech's future involvement depends upon NASA's continuing support for the Program and its willingness to collaborate with AmTech on Program development.

### **Conclusion**

As of early 1995, almost six years after the JSR Program was conceived, AmTech's demonstrated success in research, the implementation of pilot JSR projects, and the facilitation of industry-led consortia, have provided the basis for the success of the JSR Program. However, the Program's long term and continued use and acceptance by NASA remains uncertain. Future success depends primarily on the willingness of NASA management to accept a formal Program plan, with clearly stated principles for partnering with the private sector and effective procedures for implementing such partnerships in a timely manner. That plan must be officially disseminated to the Program's users (R&D managers), and it must meet the objectives of the private sector R&D partners. AmTech will continue, for as long as it receives NASA support, to provide research results in a timely manner to improve the policies and procedures for implementing the Program.

One aspect of the JSR Program that has sustained the proof of concept phase is the use by the government of neutral facilitators to find qualified partners, assist in negotiations of R&D terms and conditions, facilitate implementation of working agreements, manage the funding of the project, monitor the commercialization of the R&D, negotiate changes in the scope, goals and milestones of the R&D, and complete all phases of the non-technical administration of the project. AmTech's research and experience have demonstrated that neutral, independent facilitation must continue to be an essential element of the JSR Program if the government wishes to work with the private sector in effective cost-sharing R&D arrangements.

AmTech has developed a successful track record as a neutral facilitator. Through the team effort of a multidisciplinary staff, working for many years with the government and the private sector to facilitate common R&D objectives, AmTech has demonstrated the viability and usefulness of the concept of neutral facilitation in multiparty R&D ventures. As AmTech continues in this role, most recently in the AGATE and ERAST projects, the scope of the facilitator's role in R&D collaborations will evolve as the demands of the projects, the technologies, and the participants change.

In spite of its proven record as a facilitator of government/private sector R&D projects, the success of AmTech as a long term viable nonprofit organization remains uncertain. AmTech has evolved, for the most part, in response to the needs and desires of its sponsors within NASA. It has been managed and funded as an organization to create and implement a NASA Program that is viewed by those within NASA as both innovative and suspicious. Because the organization has been so closely aligned with the JSR Program and its sponsors, the ability of AmTech to make its own way, independent of NASA, remains an open question.

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**Introduction**

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The seeds of the JSR Program were sown in the early 1980's at the NASA Ames Research Center. From those seeds AmTech began in 1989, incorporated as a California nonprofit organization.<sup>2</sup> Since its beginnings, the JSR Program has grown, with continuous fostering and persistence by

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<sup>1</sup> Submitted to NASA March 7, 1995, in partial fulfillment of NASA Ames Cooperative Agreement NCC2-648. Written by David Lloyd, with substantial assistance from Eric Brachhausen, Stephen Gomes, Paul Masson, Karen Robbins, and Bernard Zuzo, all of the AmTech staff.

<sup>2</sup> AmTech was incorporated on July 6, 1989 as an organization subject to §501(c)(3) of the Internal Revenue Code.

AmTech, and although it is not yet a formal NASA program, it continues to have an agency-wide impact, it is being used by multiple NASA Centers, and AmTech is using the lessons learned from its experience implementing the JSR Program to assist other federal agencies with the commercialization of a variety of publicly-funded technologies.

#### **Research and Concept Development (1984-1987)**

The basic tenet of the JSR Program is the use by NASA of its Space Act authority<sup>3</sup> to obligate funds and in-kind resources to one or more private sector participants who will match NASA's obligation in order to further the R&D objectives of NASA and the other participants. Although NASA has had this authority since 1958, with few exceptions it had been unwilling to utilize it prior to the inception of the JSR Program. One such exception, notable for the development of the Program, occurred at NASA Ames, where the NASA Ames University Consortium was established in 1969 with Santa Clara University.<sup>4</sup>

This consortium, spearheaded by J. Henry Glazer, the NASA Ames Chief Counsel at the time, was unique to the Center and was the first use of the Space Act to obligate funds to universities for research purposes. At its peak, the Consortium had over 360 university participants, and the Consortium Office at NASA Ames had processed several hundred Interchanges, obligating up to \$40,000 each for research purposes. This streamlined and well-defined process was widely used at the Center and operated outside the purview of the procurement and grants office.<sup>5</sup>

In 1978, the Chief Counsel utilized the Consortium mechanism to negotiate an Interchange Agreement with the University of California, Hastings College of the Law in San Francisco, establishing the NASA/Hastings Research Project to provide legal research and assistance to his

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<sup>3</sup> This authority is found in §§203(c)(5)&(6) of the National Aeronautics and Space Act of 1958 (42 U.S.C. §2473(c)).

<sup>4</sup> Agreement Between the NASA Ames Research Center and Participating Universities for Reciprocal Use of Services, Equipment, Personnel and Facilities and for Other Purposes, executed by NASA Ames and the University of Santa Clara on September 11, 1969.

<sup>5</sup> It sometimes was referred to by those who used it as a convenient method for obtaining the necessary "arms and legs" to fill the Center's research facilities. While the NASA Ames University Consortium still exists, the use of Consortium Interchanges has been curtailed, and the Consortium Office is now part of the University Grants Office.



office.<sup>6</sup> That Project existed for ten years, and the original Interchange was amended 23 times, with total project funding exceeding \$1.4 million. The original research charter of the NASA/Hastings Research Project called for an examination of the legal aspects of living and working in space for long duration.<sup>7</sup> As the Project evolved, the legal research took on a more practical bent, examining provisions of the Space Act for ways that NASA could work more efficiently with the private sector. Research results confirmed the theory expounded by Glazer that NASA could "partner" with the private sector using the authority of the Space Act to avoid, rather than evade, the procurement laws.

In 1984, Glazer and others in the Project Office began a serious effort to transform their research into a generic "partnership agreement" by which NASA could collaborate with the private sector on various R&D projects of interest to the participants. This generic agreement was based loosely on the earlier Consortium Agreement. However, in addition to a consortium of universities working with NASA, the new version included multiple industry participants available to partner with NASA and the universities on a variety of R&D ventures of interest to all participants. The development of this agreement occurred in conjunction with a NASA-wide push for more technology transfer and development of the commercial use of space activities that began in the mid 1980's.

As this agreement took shape it became known as the "Articles of Joint Enterprise," designed to supersede and incorporate the Consortium Office. The structure for implementation of multi-party R&D ventures became more elaborate with each succeeding draft of the Articles. When finalized, it was proposed that the Joint Enterprise endeavor would be operated not by the Consortium Office, but by a General Secretariat Office, to be managed by a Joint Enterprise Council and administered by a General Secretary, with the university and industry participants each to be represented by separate Committees of Correspondence. On October 6, 1986, this structure and its underlying principles were formally accepted by NASA Ames when the Director, William Ballhaus, signed the Articles of Joint Enterprise with the

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<sup>6</sup> Both David Lloyd and Karen Robbins, currently on the AmTech staff, began their associations with NASA at the NASA/Hastings Research Project.

<sup>7</sup> This field of study came to be known as "Astrolaw," a term coined by Glazer, but never accepted by the legal community.

San Francisco State University Foundation, the agent organization for administering the Articles and establishing the General Secretariat Office.

The initial Joint Enterprise Council was composed of Richard Reeves, Associate Director of NASA Ames, and Arthur Cunningham, Chairman of the Board of the SFSU Foundation (and Dean of the SFSU Business School). The Joint Enterprise Office operations were funded by NASA Ames through a Consortium Interchange, and the interim Project Director of that office was Elizabeth Inadomi, of the NASA Ames External Affairs Office. A search began to find a permanent General Secretary of the Joint Enterprise, culminating with the appointment of Syed Shariq to that position in 1987. He was a branch chief in the information sciences division at NASA Ames, and was detailed to the SFSU Foundation through an Intergovernmental Personnel Act agreement to work full time at the Joint Enterprise office.

The initial business office for the Joint Enterprise was established at the Techmart Center in Santa Clara, and the legal office was established at the NASA/Hastings Project Office. In April 1988, both offices were consolidated into the Joint Enterprise Office in Menlo Park. By that time, Victor Peterson, NASA Ames Deputy Director, had replaced Richard Reeves on the governing council.

### **Developing the Theory (1987-1989)**

Shortly after Shariq became General Secretary, the Joint Enterprise initiated discussions with Carla Wong, a scientist from the NASA Ames information sciences division, Mike Storey of the Finnigan Corporation in San Jose, and Rick Yost, a scientist from the University of Florida, on a potential R&D collaboration to enhance and miniaturize an ion mass spectrometer. These discussions culminated 8 months later in the signing, by those participants and the SFSU Foundation, of the first Joint Enterprise Project.<sup>8</sup> This represented the first use by NASA Ames of the funded Space Act mechanism outside the Consortium Interchange arena. NASA obligated \$155,000 the first year of the project, and over \$350,000 during the three year

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<sup>8</sup> Mass Spectrometer-Based Intelligent Systems Manager (known as Joint Enterprise Project #8801). The project's goal was to extend the capabilities of and miniaturize an ion mass spectrometer, to explore the feasibility of its use on the Space Station, and for use in new product development by Finnigan.

life of the project. All funds flowed to, and were administered by the SFSU Foundation, on behalf of the Joint Enterprise Office, and were in turn disbursed to the University of Florida where most of the R&D work was done. Finnigan contributed cash and in-kind resources directly to the University of Florida. According to the participants, this collaboration worked well, generating four patents and several copyrights for the University and being commercially utilized by Finnigan within 14 months of the project's inception. For NASA and the Joint Enterprise, it proved the concept of collaboration between the private sector and NASA using a mechanism other than traditional procurement or grant instruments. It also demonstrated the value of using a neutral, nonprofit facilitator to implement multiparty partnerships.

As the NASA Ames management became increasingly familiar and comfortable with the Joint Enterprise concept, it became clear that the SFSU Foundation, which was primarily a grant administration organization, was not a suitable entity to run the business operations of the Joint Enterprise in the long term. The value of a neutral nonprofit facilitator was apparent however. Therefore, in early 1989, NASA Ames notified the SFSU Foundation of its intention to terminate the Articles of Joint Enterprise on September 30, 1989. The search then began to find an organization to replace the Foundation and assume the role of a viable neutral facilitator for Joint Enterprise projects. Shariq pursued the option of securing another nonprofit organization to provide a home for the Joint Enterprise, approaching local universities, government agencies and existing nonprofit organizations. Ultimately, NASA Ames management decided that a new nonprofit organization would be formed to replace the SFSU Foundation and assume the role of a viable facilitator for Joint Enterprise Projects. The Joint Enterprise staff was tasked with the responsibility of identifying legal counsel and preparing forms to organize such a nonprofit, and the NASA Ames management provided suggestions of candidates for a Board of Directors for the new organization.

#### **Forming the Facilitator (1989)**

American Technology Initiative was incorporated in California on July 6, 1989 by John Francis, an attorney and counsel to many nonprofit organizations, who had been retained by the Joint Enterprise staff to prepare

the documents necessary to form the organization.<sup>9</sup> Certification was obtained from the Office of Personnel Management for AmTech to host federal employees through arrangements under the Intergovernmental Personnel Act, and AmTech obtained tax exempt status as a 501(c)(3) organization from the Internal Revenue Service in early 1990.

AmTech's first Board of Directors meeting was held on January 5, 1990 in Menlo Park. Board members were recruited in part to fill the need of the young organization to advocate its programs (and its continued existence) at the highest levels of NASA and other agencies. The following individuals were elected to the Board at that meeting: Peter Banks, then Professor of Engineering at Stanford University (currently Dean of Engineering at the University of Michigan); Paul Dembling, author of the Space Act legislation and NASA's first General Counsel; John Egan, President of a consulting group specializing in commercial space activities; Richard Johnson, visiting scientist with the Universities Space Research Association and former acting Science Advisor to President Ronald Reagan; and Ray Kline, President of the National Academy of Public Administration (now retired).<sup>10</sup> Roger Heyns, President of the Hewlett Foundation (and former Chancellor of UC Berkeley), and George Kozmetsky, Director of the IC<sup>2</sup> Institute at the University of Texas, were elected affiliated (non-voting) Directors. Also at that meeting, Richard Johnson was elected Chairman of the Board, Syed Shariq was elected Chief Executive Officer, and David Lloyd was elected Secretary/Treasurer of the organization.<sup>11</sup>

AmTech was funded beginning October 1, 1989, by NASA Ames cooperative agreement NCC2-648, to conduct research into the use of the Space Act and other mechanisms for R&D collaboration with the private

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<sup>9</sup> AmTech's Articles of Incorporation state that AmTech will "[u]ndertake fundamental, theoretical, or experimental research leading to the expansion of knowledge in the areas of aerospace research, technology transfer, commercialization and related areas; undertake research directed toward the practical uses of knowledge gained from [this] research; and enhance in the private sector entrepreneurial and investment opportunities through the transfer of knowledge and technologies." Mr. Francis currently serves as AmTech's corporate counsel.

<sup>10</sup> Peter Banks resigned in 1991 and was replaced by Paul Coleman, President of the Universities Space Research Association. In 1992, the Board was increased to seven voting Directors and Stanley Weiss, Professor Aeronautics at MIT, was elected to one of the newly created positions. Currently, there is one vacancy on the Board.

<sup>11</sup> Johnson and Lloyd continue in their respective capacities.

sector.<sup>12</sup> All of the assets and resources of the Joint Enterprise Office were transferred to AmTech from the SFSU Foundation as part of NASA's termination settlement with that organization. All of the existing Joint Enterprise staff chose to be employed by AmTech, and AmTech assumed all duties and responsibilities of the SFSU Foundation in the on-going Joint Enterprise Project for development of the ion mass spectrometer.

### **Proving the Concept (1989 - 1993)**

The original theories underlying the Articles of Joint Enterprise remained, but were now supported by three years of practical experience implementing the concept. Concurrently with the start up of operations, the AmTech staff began to originate and negotiate additional Joint Enterprise projects with NASA Ames and private sector entities. As the first of these progressed towards the final stages of negotiation, the new NASA Ames Chief Counsel, George Lenehan, informed the AmTech staff that authority to sign Space Act agreements obligating NASA funds rested solely with the NASA Administrator, and that that authority had never been delegated to any other official. Consequently, the first Joint Enterprise project, as well as all NASA Ames Consortium Interchanges, had been entered into by NASA Ames without proper authorization. Lenehan subsequently decided that, because the mass spectrometry project was nearly complete, as were the majority of Consortium Interchanges, the NASA Ames' Director's lack of authority to commit the Center was of little practical consequence.<sup>13</sup>

The AmTech staff viewed the funded Space Act authority as the most important feature of Joint Enterprise projects and an important incentive for the private sector to collaborate with the government. Likewise, the ability to enter into these arrangements without seeking review and approval from NASA Headquarters was an important and valuable consideration. In order to continue with these collaborations using the funded Space Act mechanism, it was necessary to further develop the principles and procedures underlying these arrangements and seek formal approval from NASA Headquarters to continue with their development. Consequently, in early 1990, Shariq and Lenehan began a series of briefings to senior managers and the legal office at

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<sup>12</sup> NCC2-648 continues to be AmTech's primary source of funding.

<sup>13</sup> This position was later ratified by the NASA General Counsel. The Consortium Interchanges continue to be used by NASA Ames (see note 5 and accompanying text).



NASA Headquarters on the legal and practical aspects of the Joint Sponsored Research Program.<sup>14</sup> They gave similar briefings to the management and attorneys at most of the NASA Centers as well.

This "road show" raised the visibility within NASA of the JSR Program and AmTech which, in some ways, was beneficial to both. The benefits of the JSR Program became apparent to a wider audience, and AmTech was viewed by most of the users of the Program as providing a valuable service to NASA. On the other hand, this higher profile raised the ire of some at NASA when they understood that AmTech intended to become financially self-supporting based on revenue derived from oversight of JSR Projects.<sup>15</sup>

The increased visibility and apparent benefits of the JSR Program facilitated the implementation of the second JSR Project, which was a hybrid of the original idea. Because Space Act authority was not available to the participants in the time frame required to begin the research, AmTech and NASA Ames used a cooperative agreement to fund research at the Virginia Polytechnic Institute and executed a Memorandum of Understanding (MOU) with the Navy, the State of Virginia, several aeronautics companies and universities to form the ACSYNT Institute,<sup>16</sup> which began January 1, 1990. While the structure of the Institute worked well enough initially, the cumbersome use of a cooperative agreement and MOU to fund and operate the Institute relied heavily on the good will of all participants and the assumption of the risk by VPI that the government and aeronautics companies would participate as equal partners for the five year duration of the research. It also provided AmTech with a good argument to advocate use of the funded Space Act mechanism to establish the rights and responsibilities of all participants within the framework of a single agreement.

AmTech's advocacy of the JSR Program was not without risks. In the summer of 1991, the Associate Administrator for Aeronautics and Space Technology, Arnold Aldrich, suspicious of the symbiotic relationship of the

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<sup>14</sup> This term was suggested by George Lenehan, as a way of distinguishing this Program from the Joint Enterprise, which had developed negative connotations within NASA.

<sup>15</sup> Over time, the AmTech management realized that the goal of financial self-sufficiency based on JSR project-derived revenue was not attainable given the complexity and practicalities of the JSR Program and NASA's reluctance to support this principle.

<sup>16</sup> Aircraft Synthesis Software for the Conceptual Design of Aircraft (ACSYNT). The NASA Ames' Principal Investigator for this project is Paul Gelhausen.

JSR Program and AmTech, directed NASA Ames to restructure its relationship with AmTech by creating a separate NASA JSR Program and appointing an Ames Technical Monitor to oversee the Program. In addition, Aldrich instructed NASA Ames to investigate alternative legal relationships between NASA and AmTech, intended to provide more NASA control over the JSR Program. The NASA Ames Director, Dale Compton, initially responded by ordering that the JSR Program and the funding relationship with AmTech be terminated, deeming the Aldrich instructions too restrictive to implement. Shariq used research supplied by the AmTech staff to convince the NASA Ames management and Aldrich of the value of continuing the existing cooperative relationship between NASA and AmTech. The Program was restructured to establish a Technical Monitor at NASA Ames, and AmTech proposed entering into a Memorandum of Understanding with NASA Headquarters for implementation of the JSR Program. To facilitate that implementation, NASA formed a JSR Program Advisory Group, composed of representatives from Headquarters and Ames.<sup>17</sup> This group met approximately every two months through mid-1992, to approve AmTech-designed policies and procedures for an agency-wide program, to advocate strategies for delegating funded Space Act authority from the Administrator, and to resolve issues arising from JSR projects in various stages of development. On March 31, 1992, Administrator Richard Truly delegated his authority to enter into JSR Agreements (funded Space Act agreement) to the Associate Administrator for Aeronautics and Space Technology and to the Assistant Administrator for Commercial Programs, and on June 15, 1992, AmTech and NASA signed the MOU establishing the principles for implementation of the JSR Program.<sup>18</sup>

During this time period, AmTech originated and facilitated additional JSR projects as "case studies" for the Program. AmTech established quantitative annual targets of negotiated projects in discussions with NASA JSR Program managers. Of the first six JSR projects negotiated between

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<sup>17</sup> The original appointees were Jack Mannix, from the Administrator's staff, Stan Sadin, from the Office of Aeronautics and Space Technology, and Victor Peterson, Ames' Deputy Director. When Mannix became Assistant Administrator for Commercial Programs, he appointed Frank Peñaranda as his representative. Peterson appointed George Lenehan as his representative from Ames.

<sup>18</sup> Both the delegation of authority and the NASA/AmTech MOU were for terms of two years. Both have been extended through 1995.

NASA and industry, two were implemented at NASA Ames.<sup>19</sup> The others were not implemented because final signature authority had not been delegated by the NASA Administrator. However, the unsigned transactions, together with an average of ten potential projects facilitated by AmTech each year, provided valuable research results which were compiled and presented to NASA. Because of the large volume of facilitated but unsigned transactions, AmTech's focus shifted from that of a facilitator of JSR Projects<sup>20</sup> to an advocate of those policy changes within NASA necessary for the Administrator to delegate signature authority, thereby enabling NASA to capitalize on the financial and commercial value of those projects. This was consistent with past requests by NASA management for AmTech assistance on activities not related to the JSR Program or projects.<sup>21</sup>

AmTech also developed a relationship with the Technology Transfer Office at DARPA,<sup>22</sup> and received funding to undertake research on the implementation of a technology transfer plan for DARPA's High Performance Computing and Communications Program initiative. This research culminated in 1993 with AmTech's final report of results and findings to the DARPA Program Manager, Tice De Young.

### **Concept Implementation, Acceptance and Expansion (1993-1995)**

After the national elections in 1992, new government policies emphasized the development and commercialization of federally-funded technologies as a mechanism for increasing the economic competitiveness of U.S. industry. Partnerships between the government and the private sector

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<sup>19</sup> The Video Luminescent Barometry project between NASA Ames (Blair MacLachlan, Principal Investigator), Boeing, and the University of Washington, to develop a system to measure aerodynamic parameters (pressure and temperature measurements) on aircraft (scheduled for completion in 1996); and the High Capacity Fluids project (known as "Astro-ade") between NASA Ames (John Greenleaf, Principal Investigator), Shaklee Corporation and San Francisco State University, to develop a rehydration drink for astronauts re-entering the earth's atmosphere (completed in 1994).

<sup>20</sup> The JSR Program manager at the time, Kevin Barquinero (Office of Commercial Technology, NASA Headquarters), viewed AmTech primarily as a facilitator of projects.

<sup>21</sup> For example, during the summer of 1992, Shariq took a leave of absence from AmTech, at the request of Victor Peterson, to serve on the committee examining NASA's technology commercialization policies (known as the Creedon Committee). He also assisted the University of Texas at Austin with the research underlying its successful proposal to NASA for the development of technology incubators at the NASA Ames and the NASA Johnson Space Centers.

<sup>22</sup> Defense Advanced Research Projects Agency (now ARPA).

were encouraged and supported. This support was reflected by increasing the budgets of several agencies, and by implementing new programs such as the multi-agency Technology Reinvestment Program (TRP) and the Advanced Technology Program (ATP) within NASA. In 1994, for the first time, the NASA Administrator issued a statement proclaiming technology commercialization as a NASA mission, as important to the agency as any other mission.<sup>23</sup>

The JSR Program fit well into this new government R&D partnership paradigm. As the Program expanded to other Centers, its scope widened, improving its usefulness to NASA R&D managers and to the private sector. The JSR Program Manager at the time, Kevin Barquinero from the Office of Commercial Programs, used the Administrator's delegation of Space Act authority as a basis to conclude that universities or nonprofit research institutions were no longer required participants in JSR Projects, and further that NASA could directly fund any private sector participant in R&D partnerships using the Space Act mechanism instead of a contract or grant.

This change in Program scope increased AmTech's ability to generate potential JSR projects. In late 1994, AmTech succeeded in implementing the Environmental Research Aircraft and Sensor Technology (ERAST) Alliance, after a 12-month formation effort. This Alliance, managed at the NASA Dryden Flight Research Center, with NASA funding of \$42 million over five years, will develop systems on unpiloted high altitude, long duration aircraft to be used for environmental research and monitoring. Private sector participants include five small aircraft companies and the Association of Unpiloted Vehicle Systems. AmTech also is a participant in the Alliance, engaged in fiduciary management, technology commercialization research, and dispute resolution as necessary.

In parallel with the development of the ERAST Project, AmTech facilitated and implemented in October 1994, the Advanced General Aviation Technology Enterprise (AGATE) Alliance, a consortium of NASA and more than 80 aircraft and avionics companies and research institutions. This is the largest consortium ever funded by NASA. It is an eight year endeavor designed to modernize the cockpit and flight technologies for the general

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<sup>23</sup> See *NASA Commercial Technology: Agenda for Change*, National Aeronautics and Space Administration, July 1994.

aviation industry in the U.S. As in the ERAST Alliance, AmTech is tasked with monitoring in-kind contributions, commercialization research and mediation if necessary. Fiduciary management for the Alliance will be handled by the AGATE Project Office at the NASA Langley Research Center, with the exception of annual membership dues from the private sector participants, which AmTech will collect.

In early 1993, the NASA/AmTech IPA Agreement for Shariq's services ended, and he returned to full time duty at NASA Ames as Staff Assistant to the Deputy Director.<sup>24</sup> He was replaced by AmTech's first CEO hired from the private sector, Stephen L. Gomes, who began his tenure May 1, 1993. Concurrent with that appointment, AmTech began to diversify its sources of support from other federal agencies, and began outreach to the private sector. AmTech received funding in early 1994 from the Ballistic Missile Defense Organization (BMDO) to participate in various technology applications review panels across the country, evaluating the commercialization potential of various advanced technologies and making recommendations to BMDO concerning improvements in the review and commercialization processes it utilizes.<sup>25</sup> With this increased visibility and experience, AmTech began to refine the tools and expertise necessary to broaden its outreach.

In late 1994, as part of its effort to attain long term corporate viability and self-sufficiency, and based on its experience with the JSR Program, the AmTech staff developed the following corporate vision and mission statements that will guide the organization into the future.

#### *The AmTech Vision*

AmTech is dedicated to improving the quality of life and the environment by moving technology from innovation to application.

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<sup>24</sup> He subsequently became Director of the Commercial Technology Office, which was created after a reorganization of the Center, and which now controls the funding for and oversees AmTech's implementation of the JSR Program.

<sup>25</sup> BMDO also asked AmTech to help facilitate the commercialization of two technologies with high potential for commercialization. To this end, AmTech currently is assisting the Sandia National Laboratory with the commercialization of its RHEPP (Repetitive High Energy Pulse Power) technology, and has located several BMDO-sponsored technologies at the Jet Propulsion Laboratory with commercialization potential.



### The AmTech Mission

AmTech is the leading interdisciplinary nonprofit organization focused on public and private R&D partnership formation, research and education. AmTech's purpose is to enhance American economic competitiveness by advancing the commercialization of technology for the public benefit.

### **Future Strategies (1995 and beyond)**

As AmTech grows and matures, it continues to supplement and refine its experience in order to diversify its support and make its expertise available to other agencies and to the private sector. At the same time, AmTech is committed to facilitating and implementing additional JSR projects with NASA, using its research to suggest changes and improvements to the Program and to advocate agency-wide use, acceptance and formal implementation of the JSR Program. AmTech has worked to make the Program a valuable tool that can be used by all NASA Centers to work effectively with the private sector. Although AmTech's support for and commitment to the JSR Program remain strong, AmTech's future involvement depends upon NASA's continuing support for the Program and its willingness to collaborate with AmTech on Program development.

### **Conclusion**

As of early 1995, almost six years after the JSR Program was conceived, AmTech's demonstrated success in research, the implementation of pilot JSR projects, and the facilitation of industry-led consortia, have provided the basis for the success of the JSR Program. However, the Program's long term and continued use and acceptance by NASA remains uncertain. Future success depends primarily on the willingness of NASA management to accept a formal Program plan, with clearly stated principles for partnering with the private sector and effective procedures for implementing such partnerships in a timely manner. That plan must be officially disseminated to the Program's users (R&D managers), and it must meet the objectives of the private sector R&D partners. AmTech will continue, for as long as it receives NASA support, to provide research results in a timely manner to improve the policies and procedures for implementing the Program.

One aspect of the JSR Program that has sustained the proof of concept phase is the use by the government of neutral facilitators to find qualified partners, assist in negotiations of R&D terms and conditions, facilitate implementation of working agreements, manage the funding of the project, monitor the commercialization of the R&D, negotiate changes in the scope, goals and milestones of the R&D, and complete all phases of the non-technical administration of the project. AmTech's research and experience have demonstrated that neutral, independent facilitation must continue to be an essential element of the JSR Program if the government wishes to work with the private sector in effective cost-sharing R&D arrangements.

AmTech has developed a successful track record as a neutral facilitator. Through the team effort of a multidisciplinary staff, working for many years with the government and the private sector to facilitate common R&D objectives, AmTech has demonstrated the viability and usefulness of the concept of neutral facilitation in multiparty R&D ventures. As AmTech continues in this role, most recently in the AGATE and ERAST projects, the scope of the facilitator's role in R&D collaborations will evolve as the demands of the projects, the technologies, and the participants change.

In spite of its proven record as a facilitator of government/private sector R&D projects, the success of AmTech as a long term viable nonprofit organization remains uncertain. AmTech has evolved, for the most part, in response to the needs and desires of its sponsors within NASA. It has been managed and funded as an organization to create and implement a NASA Program that is viewed by those within NASA as both innovative and suspicious. Because the organization has been so closely aligned with the JSR Program and its sponsors, the ability of AmTech to make its own way, independent of NASA, remains an open question.